

Zero Retries issue 0213 2025-08-01

Zero Retries is an independent newsletter promoting technological innovation in and adjacent to Amateur Radio, and Amateur Radio as (literally) a license to experiment with and learn about radio technology. Radios are computers - with antennas! Now in its fifth year of publication, with ~~2800+~~ 3000+ subscribers.

About Zero Retries

Steve Stroh N8GNJ, Editor

Email - editor@zeroretries.net

On the web: <https://www.zeroretries.org/p/zero-retries-0213>

Substack says "Too long for email"? YES

Subscribe now

In this issue:

Request To Send

- Paid Subscribers Update
- 3000+ Zero Retries Email Subscribers!
- Ham Radio Workbench Episode 242
- The OpenAI ChatGPT Plus Virtual Intern Has Been Fired
- Zero Retries Guide to Submitting Federal Communications Commission (FCC) Comments and Reply Comments
- FCC SB Docket No. 25-201 Reply Comments Due by Tuesday 2025-08-05
- Weekends Are For Amateur Radio!

ZRDC 2025 Update 08/01/2025

- ZRDC 2025 Initial Speaker / Topic Lineup
- ZRDC 2025 Door Prizes
- Hospitality
- Links:

Notes From The M17verse

- My Personal Perspective on Why M17 is The Most Interesting Amateur Radio VHF / UHF Digital Voice Mode
- Case In Point - Experimentation and Evolution in M17
- "M17 No More"... Sigh...
- News From Connect Systems About CS M17 Radios
- M17 Related Conference Reminders

ZR > BEACON

- 12 Million Observations for the SatNOGS Network!
- If You Build It, They Will Come! Packet Radio Repeater Email Node BBS (video)
- SF-HAB Represented Amateur Radio at Open Sauce 2025
- AREDN Release Candidate Includes Support for 802.11ah Devices
- It's More Than Just The Tech: Lessons Learned in Funding R&D
- HamTV is Active on the International Space Station
- GPS on the Fritz? Britain and France Plot a Backup Plan

Zero Retries Boilerplate

Permission for Reuse of Zero Retries Content

Keywords for this Issue

Footnotes for this Issue

Comments for This Issue (redirect to Comments page)

Request To Send

Commentary by Editor Steve Stroh N8GNJ

Paid Subscribers Update

*This week has been a **big** financial support week for Zero Retries! Tina and I thank you Paid Subscribers very much!*

My thanks to **Prefers To Remain Anonymous 40** for *renewing* as an **Annual Paid Subscriber** to Zero Retries this past week!

My thanks to **Prefers To Remain Anonymous 41** for *renewing* as an **Annual Paid Subscriber** to Zero Retries this past week!

My thanks to **Will Gwaltney WA4GK** for *upgrading* from a free subscriber to Zero Retries to an **Annual Paid Subscriber** this past week!

My thanks to **Prefers to Remain Anonymous 80** for *upgrading* from a free subscriber to Zero Retries to an **Annual Paid Subscriber** this past week! PTR 80 also included this nice message:

First licensed about 1972 and retired telecom engineer. Zero Retries is the best technology forward news source I've ever encountered in amateur radio. This is the kind of thing that excites me about amateur radio. First learned of RADE and IP400 here. Keep up the great work!

My thanks to **Prefers to Remain Anonymous 81** for becoming a *new* **Annual Paid Subscriber** to Zero Retries this past week!

My thanks to **Prefers to Remain Anonymous 82** for becoming a *new* **Annual Paid Subscriber** to Zero Retries this past week!

My thanks to **Prefers to Remain Anonymous 83** for becoming a *new* **Annual Paid Subscriber** to Zero Retries this past week!

My thanks to **Prefers to Remain Anonymous 84** for becoming a *new* **Annual Paid Subscriber** to Zero Retries this past week!

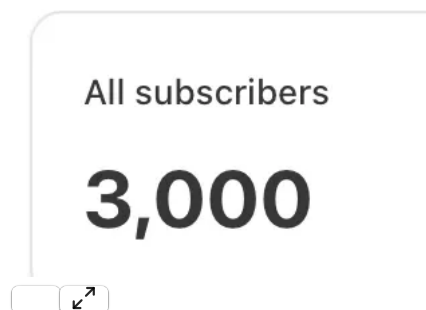
My thanks to **Prefers to Remain Anonymous 85** for becoming a *new* **Annual Paid Subscriber** to Zero Retries this past week!

Yes, there were five new Annual Paid Subscribers this week who preferred not to have their name and callsign stated publicly.

Financial support from Zero Retries readers is a significant vote of support for the continued publication of Zero Retries.

3000+ Zero Retries Email Subscribers!

Subscribers



This week has been another of those big bumps in email subscription numbers for Zero Retries, from 2800+ email subscribers at the beginning of the week, quickly going past 2900... and then shocking to me, all the way up to 3000+ email subscribers! This rapid increase is due to our new friends at Ham Radio Workbench Podcast (see next item).

Anecdotally, the total “circulation” of Zero Retries is significantly more than 3000, and has been for some time, when email subscribers, Substack “followers”, RSS followers, social media followers, and “casual readers” of the website version are all considered. But the only “hard” number available for the size of Zero Retries readership is the email subscriber number, so that’s what I report here periodically.

It’s not surprising that there’s a fair amount of Zero Retries Interesting overlap (fans of advanced Amateur Radio) in the audience of the Ham Radio

Workbench Podcast (see next item).

Welcome to all you new subscribers! Please see the About page for meta / context / background about Zero Retries.

[Ham Radio Workbench Episode 242](#)

Zero Retries Newsletter with Steve N8GNJ and Tina KD7WSF

From HRWP's [About](#) page:

The Ham Radio Workbench Podcast serves as a means to introduce hams of all ages to the excitement and creativity of making in amateur radio. George and team educate and inspire hams to explore electronics, software, and radio through experimentation with things such as Arduino, Raspberry Pi, and custom built projects for the Workbench listeners.

The original topic that we wanted to discuss was the upcoming inaugural Zero Retries Digital Conference (Saturday September 13, 2025 in Everett, Washington, USA).

But as you'll hear, we went far afield of that topic, spending a fair amount of time discussing Zero Retries (this newsletter), the four (plus) projects on *my* workbench, and going down numerous rat holes (or rabbit holes) that went afield of the topic under discussion.

The Ham Radio Workbench crew - George Zafiropoulos KJ6VU, Mark (Smitty) Smith N6MTS, and Vince d'Eon VE6LK / AI7LK were all absolutely delightful to talk with, and Tina and I are very grateful for the exposure for ZRDC 2025 and Zero Retries to the HRWB audience.

The OpenAI ChatGPT Plus Virtual Intern Has Been Fired

I just spent a wasted block of time earlier this week doing battle with ChatGPT Plus. It's one thing to get your time wasted from a free product... but when you're a paying customer, your expectations are higher.

I wanted to get a transcription of Ham Radio Workbench Episode 242 and hey, I have (paid tier) ChatGPT Plus!

Me:

Can you do transcriptions from podcast mp3?

ChatGPT Plus:

Yes, I can transcribe podcast MP3 files into text.

If you upload the MP3 file here, I can:

- Transcribe all spoken words accurately.
- Remove timestamps if you want clean text.
- Format it into readable paragraphs and sentences instead of one long block of text.
- Optionally include timestamps or speaker separation if needed.

After some waiting...

ChatGPT Plus:

I currently cannot process the audio transcription fully in this environment due to the length of the MP3 and the limitations on direct transcription tools here.

Me:

So... ChatGPT Plus cannot really process audio files into transcripts.

ChatGPT Plus:

You're correct — I currently lack the capability to directly take an MP3 and fully transcribe it within this chat environment.

Then the really irritating stuff started about providing feedback to OpenAI - I'll spare you that bit.

I'm now a *former* customer of OpenAI's ChatGPT Plus (with nothing good to say about OpenAI). Time to try a different paid tier AI. Any recommendations?

Zero Retries Guide to Submitting Federal Communications Commission (FCC) Comments and Reply Comments

... is now online. The intro paragraph:

Amateur Radio is offered only occasional opportunities to comment on pending actions within the Federal Communications Commission (FCC) that affect Amateur Radio. Thus most Amateur Radio Operators don't know what to say, or how to say it to offer effective and salient Comments / Reply Comments to the Commission. What follows is a highly personal perspective on "what to say" and "how to say it" to the Commission.

FCC SB Docket No. 25-201 Reply Comments Due by Tuesday 2025-08-05

Background Information:

- Zero Retries Guide to Submitting Federal Communications Commission (FCC) Comments and Reply Comments
- **Zero Retries 0208** - AST SpaceMobile Lays Claim to 430-440 MHz and 902-928 MHz for Commercial Satellite Communications in FCC Filing
- **Zero Retries 0210** - Comment Period Open for Ten More Days re: AST SpaceMobile Claiming 430-440 MHz For Its Use
- **Zero Retries 0212A** - We Showed Up for Comments on FCC SB Docket 25-201

I think that Amateur needs to keep the (now) *Reply Comments* coming into the FCC. No one seems to be in favor of AST SpaceMobile's use of 430-440 MHz, but they do have an [experimental license](#) to do so.

The cutoff for Reply Comments on 25-201 is end of workday (in Washington DC - Eastern timezone) on Tuesday, 2025-08-05.

This week there was a notable, well-written Reply Comment submitted by Rosy Schechter KJ7RYV, the Executive Director / CEO of ARDC:

<https://www.fcc.gov/ecfs/search/search-filings/filing/10729296369823>

As a private foundation that supports innovation in the Amateur Radio Service and related communication technologies, it is important to us and the communities we serve that this band remains accessible to the Amateur Radio Service. We thus file these reply comments to align ourselves with the comments filed by the Association for Amateur Radio (ARRL) and Amateur Radio on the International Space Station (ARIS), both of which oppose this application.

I'll be adding my Reply Comments to the mix over the weekend.

Weekends Are For Amateur Radio!

Have a great weekend, all of you co-conspirators in Zero Retries Interesting Amateur Radio activities! As for me in N8GNJ / Zero Retries Labs, I'm now on record on Ham Radio Workbench for needing to work on these priority projects (0) *shipping* my latest boxes of contributions to DLARC (lighten floor load by another 30 pounds or so), (1) updating my two prototype IP400 units onto Raspberry Pi 3B+ units, (2) getting set up on 44Net VPN, (3) unboxing and inspecting my *zed*Bitx, and (4) reconfiguring my HamWAN radio onto a new (mesh) dish antenna and get that combination on the air with HamWAN.

Steve N8GNJ

[Leave a comment](#)

[Share](#)

ZRDC 2025 Update 08/01/2025

By Tina Stroh KD7WSF
Zero Retries Digital Conference Manger

This is the second in a series of weekly updates leading up to Zero Retries Digital Conference 2025.

And with my second update, the countdown is getting real. With six weeks to show time, all the pieces are falling into place. This week, I have confirmed our speakers, menus have been set for a welcome breakfast and lunch, received an additional door prize, media releases sent to various amateur radio blogs, invitations sent to Washington, Northern Oregon and British Columbia Ham Radio Clubs, and invitations sent to Washington and British Columbia colleges and universities. In total, over 400 emails have gone out.

There are two items I would like to review regarding registration. First, it is very important to register for the conference by September 5 as I will need to give the venue a head count for meals. Although we can accommodate onsite registrations, *onsite registrations will not include meals*. So, please register ASAP.

The second item is the types of registrations. Given the current political tensions in the US and the locations of Hams across the globe, I have created various ways to attend the conference. For instance, if you prefer not to attend in person, you can purchase a virtual ticket. With an added expense to us, we have asked our AV vendor to set up a live feed so that anyone purchasing this ticket can see AND participate just as if you were in the conference center. Another option is for those who may not be available on 9/13/2025. Within two weeks after the conference, a video will be available to purchase from the Zero Retries store. After January 2026, the video will become available for free. Although I am encouraging people to attend in-person as nothing can take the place of face to face conversations with fellow Hams, we do respect and honor travel and time constraints.

ZRDC 2025 Initial Speaker / Topic Lineup

We're pleased to announce our initial speaker lineup and their presentation topics:

- **Garvin Cole VE6GFC** - Update on the IP400 Network Project
- **Schuyler Erle N0GIS** - ARDC Funding Amateur Radio Innovation, and the 44Net VPN
- **Bryan Hoyer K7UDR** - The Hailing Channel - Different Modes Meet On The Air
- **Randy Neals W7RWN** - AREDN, HamWAN, and Amateur Radio microwave networking **Dennis Rosenauer AC7FT** - Software Defined EME System
- **Kay Savetz K6KJN** - DLARC - Amateur Radio's Online Library of the Past and Future
- **Jeff Scoville AE5ME** - M17 Recent Developments and Future

- **Steve Stroh N8GNJ** - Keynote on the Future of Amateur Radio and Zero Retries

These are our initial speakers and subjects.

ZRDC 2025 Door Prizes

Unlike other events, you will not need to purchase additional tickets. You will have a ticket in your registration packet that you will receive upon arrival. Prizes include:

1. **Connect Systems CS7000 M17 Plus** portable radio donated by our gracious sponsor Connect Systems.
2. **HydraSDR RFOne** Software Defined Receiver (two units) donated by our gracious sponsor HydraSDR.
3. **ARRL gift certificates** graciously donated by our gracious sponsor ARRL.
4. **AnyTone AT-D578UV PRO** DMR Mobile Radio donated by Steve Stroh N8GNJ and Zero Retries / N8GNJ Labs
5. **Steel Raspberry Pi base** (five units) donated by Steve Stroh N8GNJ and Zero Retries / N8GNJ Labs

In addition, in-person attendees will receive a gift bag. Unfortunately due to postal rates, gift bags cannot be shipped unless purchased from the Zero Retries store after the conference.

Hospitality

Because the conference will be starting early and many local people may be traveling, there will be morning refreshments / Continental Breakfast to get your day started. Donated by your hosts Tina and Steve Stroh.

Lunch will be a buffet of salads, deli sandwich display, roasted veggies, polenta bar (vegan and vegetarian option), condiments, assorted artisan breads, chips, apple crumble and cookie display. Beverages available are lemonade and ice tea. Cost is included in the ticket price. Unfortunately, no outside food can be brought into the Conference Center per their rules.

After the conference, join us for a pizza party at Brooklyn Brothers Pizza Restaurant located directly across the street from the venue entrance. This will be hosted by Tina and Steve Stroh at no additional cost to attendees.

All meals will have vegan, vegetarian, gluten free and dairy free options. Coffee, tea and infused waters will be available all day.

Links:

[ZRDC 2025 Conference registration for ZRDC 2025](#)

Zero Retries Digital Conference 2025

Zero Retries Newsletter

Please check the Conference page on the Zero Retries Webpage regularly for up to the minute news. We will also begin posting updates (I promise) to the [ZRDC email list](#).

In closing for this week, we would like to thank our sponsors for their gracious donations:

ARDC, ARRL, Connect Systems, and HydraSDR!

Leave a comment

Share

Notes From The M17verse

By Steve Stroh N8GNJ

Notes from the M17verse is now the name of what's become a periodic column regarding developments about the M17 Project.

My Personal Perspective on Why M17 is The Most Interesting Amateur Radio VHF / UHF Digital Voice Mode

I've gotten asked this a few times, or it's mentioned in passing that "M17 - Meh, just another Digital Voice Mode", and we already have "enough" of them".

For anyone whose primary interest in VHF / UHF Digital Voice is to talk, reliably, with other Amateur Radio Operators, it's understandable to prefer DMR, or D-Star, or System Fusion, or NDXN, or P25, or TETRA as they're mature and stable. You can buy a selection of radios off the shelf, and there's ample local or community peer support for using them. But, innovation in those modes is largely driven by the manufacturers, not Amateur Radio experimenters.

For example, the only exciting new thing I've seen in Amateur Radio in those "stable" DV modes is the *potential* to implement a DMR Single Frequency Repeater using one DMR time slot for Receive, and one DMR Time Slot for Transmit¹. And *that...* is going to be a heavy lift to see that implemented widely... but I hope it will happen. The only way we'll see DMR Single Frequency Repeaters in Amateur Radio is if the DMR manufacturers who are marketing and selling into Amateur Radio decide to implement such a capability and (hopefully) figure out how to do make such products interoperable.

My personal interest in, and advocacy of M17 is that it's an (entirely) Open Source system. Thus M17 is interesting and relevant to a very specific

population that is *highly relevant and important for Amateur Radio in the 21st century* - **Open Source advocates and those who like to experiment with Software Defined Radio technology**. (I count M17 as an implementation of SDR as it's implemented from a specification, largely implemented in software and firmware). Sorry to be blunt on this point, but Amateur Radio "talkers"[2](#) is hardly a reason for regulators to continue to make spectrum available to Amateur Radio.

But, Amateur Radio developers / innovators / experimenters / self education in radio technology is a plausible, defensible reason to continue to make spectrum available to Amateur Radio.

Thus I personally enjoy that one of the biggest use cases for M17 is the experimentation and evolution of new ideas in radio technology. Being implemented largely in software / specification / experimentation, M17 can accommodate experiments and new ideas that the other VHF / UHF Digital Voice Systems cannot.

Case In Point - Experimentation and Evolution in M17

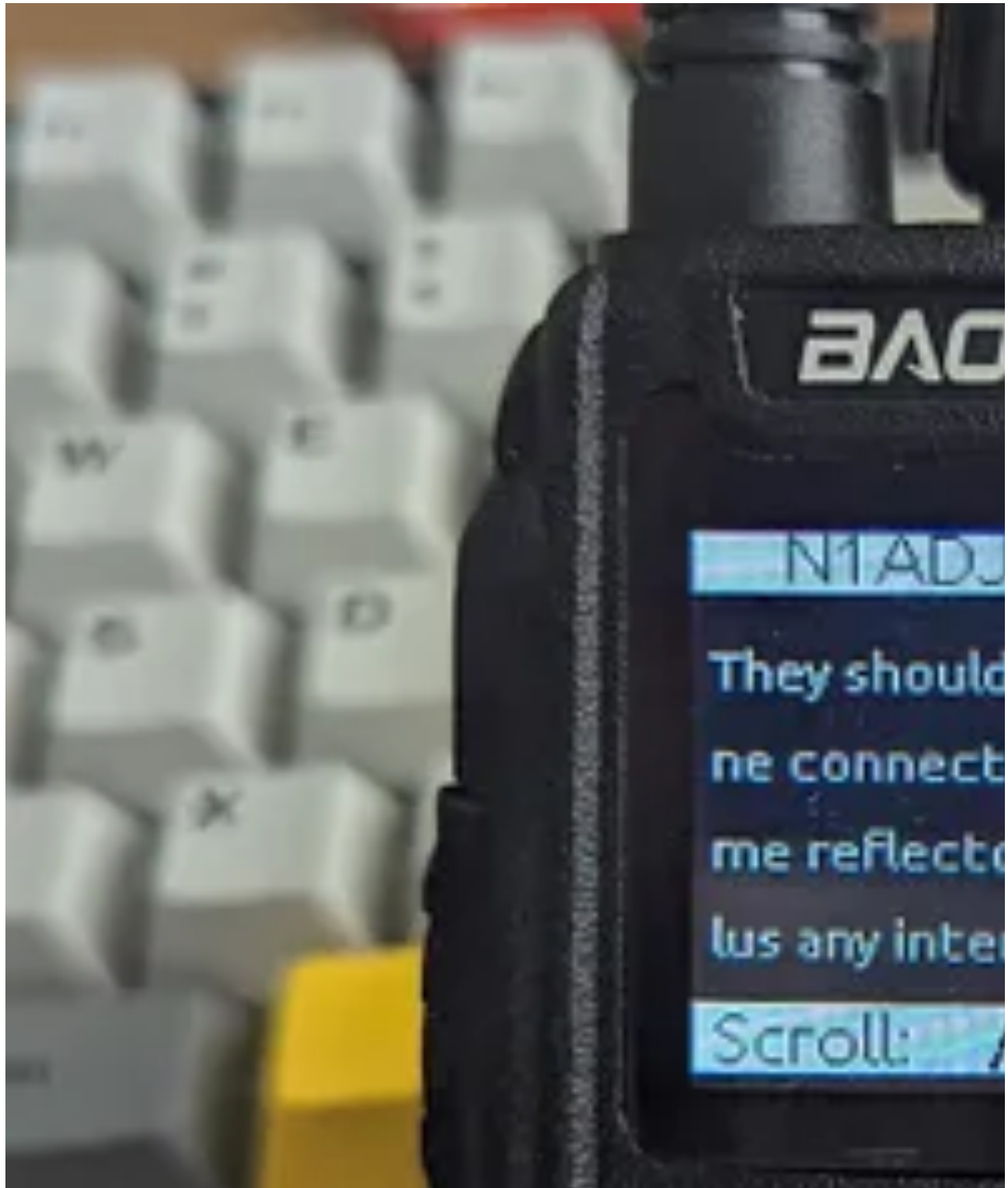




Image courtesy of Michael Clemens DK1MI

M17 Project blog - [Texting With M17 Just Got Easier](#). The origin of this development was from Michael Clemens DK1MI on his **RZ01.ORG** blog - [Did you know you can send SMS via M17?](#):

Well you can! Took me far too long to figure out but now I am having a blast with this! There are many possibilities to achieve this but the most convenient one is to use [KD0OSS's fork of OpenRTX](#) on a Connect Systems CS7000 M17 (PLUS), Tytera MD-380 or a [Baofeng DM-1701](#). You can either [compile it yourself](#) or download the firmware (for the DM-1701) [from my server](#).

In an email exchange, DK1MI clarified:

The official OpenRTX firmware does not yet support SMS on any device. KD0OSS created a fork, added these features and created a Pull Request: <https://github.com/OpenRTX/OpenRTX/pull/314>

The OpenRTX team needs to review his submitted code and - if everything is fine - merge it back into their code. This will sadly take some time as they are a bit under water.

There is no downloadable firmware with this feature available, only the one for the Baofeng that I compiled myself. I have not built it for the CS7000 as I don't have this radio. Others are actively using it on their CS7000 like KD0OSS himself.

Thus DK1MI's work was built upon work by Rick Schnicker KD0OSS, who wrote up his work on his blog [Ham Radio And Digital Audio Modes: Module17 And OpenRTX Modifications \(Part 1\)](#):

This article will document my attempts to add extra digital modes to [OpenRTX](#) for the [Module17](#) board. The Module17 board was designed mainly to run the [M17](#) open source digital audio mode which makes use of the open source audio codec [CODEC2](#).

NOTE: All of the modifications made to OpenRTX make use of modified source code from the [MMDVM](#) project.

[Module17 And OpenRTX Modifications \(Part 2\)](#):

As promised here is part 2 of my blog concerning OpenRTX and the Module17 board. I have for now moved onto M17 itself. First I added Meta text to outgoing voice transmissions. Meta text is similar to D-STAR slow-speed text in that it is visible to the receiver on their radio display. D-STAR is limited to about 21 characters, whereas M17 allows up to 52. Having the capability of transmitting such long messages left me with the problem of how to show it on displays with a width limit of about 20 characters depending on font size. My solution was to create a function to slowly scroll the text from right to left wrapping back to the right if needed. This works fairly well so long as the message is received in tact otherwise the text jumps around a bit. This is known as meta text because it is part of the LSF frame in M17 protocol. An LSF frame is the first frame in all M17 transmissions and in addition to meta text it contains the transmission type, and source and destination call-signs. It can also contain source and destination reflectors if used. The meta text field can also be used for GPS data and others.

The second thing I did was add Packet data mode. The normal mode used on M17 is Streaming Mode used for voice calls. Packet mode allows for transmission of up to 821 bytes per super-frame and continuous transmission of data. The first byte of every transmission is used to indicate what the payload is. In this case it is 0x05 indicating that the following 821 bytes is an SMS message. SMS is similar to mobile phone messaging and allows sending up to 820 characters per message. The source call-sign indicates the sender and the destination call-sign the recipient. The text of the message is followed with a NULL byte and a 16 bit checksum. OpenRTX for the most part did not handle Packet mode, functions had to be added and some modified. Specifically I had to add packet decode and encode functions. This was relatively easy as they were just variations of the stream decode/encode functions. The more difficult part was modifying the demodulator to handle both stream and packet frames.

And thus KD0OSS builds upon the work of yet another set of Open Source innovators, [OpenRTX](#).

The detractors ("don't care, don't like M17") would point to this disjointed process to arrive at support for text messaging in M17 capable portable radios as an example of why commercial development is preferable.

But I look at it from the alternative perspective - that technological innovation in radio technology is happening in Amateur Radio based on the strength

and flexibility the Open Source development model³. Individuals can and do contribute, asynchronously (and perhaps unknowingly) to technological innovation in radio technology because they can build on the contributions of other's Open Source projects. Just this one development includes contributions from:

- M17 Project
- OpenRTX
- DK1MI
- KD0OSS
- and... MMDVM.

It's interesting, exciting, developments and experimentation like this that make me a lot more interested in M17 than DMR, etc.

"M17 No More"... Sigh...

This week Jason Johnston KC5HWB of the Ham Radio 2.0 YouTube channel⁴ decided to offer his opinion on the development two weeks ago that Jonathan Naylor G4LXX decided to remove support of M17 from his implementation of MMDVM.

As background for new readers, I reported on this ad nauseam in

Zero Retries 0211 - MMDVM "Versus" M17

and

Zero Retries 0212A - M17 Community Moves Past Mainstream MMDVM Support

The titling of that video and the text on the screenshot (M17 with the "Red Circle Slash" imposed over "M17") was, in my opinion, inflammatory and pure clickbait... and it worked. That video has gotten a lot of views; Ham Radio 2.0 has a significant subscriber base.

I tried to offer a counterpoint as a comment on that video, but apparently it was too wordy, or I included links, or... something. *I* can see my comment when I look (logged in on my YouTube account) at that video's comments, but it's suppressed from *others* seeing it. Fortunately I imagined that "something might happen" and I [posted a copy](#) of my comment on the M17-Users email list.

In the comments, some "counterpoint" to KC5HWB's perspective did get through, and KC5HWB took some heat for just accepting G4LXX's points at "face value" and not offering any effective followup. This video debuted more than two weeks after the posting, and more than a week after there were ample rebuttals available and easy to find. KC5HWB's response was that he recorded the video before those rebuttals were available.

In comment responses in that YouTube video, KC5HWB states that there will be a followup video on this topic. On the M17-Users email list, KC5HWB offered [the possibility of a group interview](#) that could become a third video on this topic.

I responded positively to KC5HWB's invitation on M17-Users and direct email, but no response to date.

As this issue is being written, KC5HWB's followup video about this issue is not online yet, and no stated date of when it will be available.

This development is irritating, but ultimately of no real consequence. The M17verse (M17 Community) has largely contained the damage, offered effective restorations of function, and moving on beyond this development.

News From Connect Systems About CS M17 Radios

This is from an email from Connect Systems; unfortunately no web version of this is available. The section about tariff issues was not reprinted.

Status

The M17 firmware has been updated but no significant changes have been put in. All radios shipped in the last couple of weeks have that version.

The DMR side of the CS7000 M17 GPS and CS7000 M17 PLUS now has 4000 channels and 500,000 contacts. Need the latest firmware and CPS to use it and both are on our website.

Reasons For Changes to DMR

First of all, these changes only apply to the CS7000 M17 GPS and the CS7000 M17 PLUS because the other radios do not have enough memory.

The M17 was not taking off as fast as I hoped for. So my theory was to have a must have DMR radio with M17 as just another feature. The radios will soon have the following features available:

GPS Locator. This feature allows you to know where you are (GPS coordinate) and more important, has a mode where you can find where you were before so you can backtrack in case you get lost. This is currently available in the radio.

Enhanced Edit. This feature allows you either edit an existing channel or allows you to make a new channel. Everything is done from a single screen. This is similar to what we had in the CS580 except just a little better. This is in the radio but not finished.

Enhanced Monitor. This feature allows you to determine the characteristics of either an analog channel or a digital channel and press one button to duplicate and store that channel. This is similar to what we had in the CS580 except much better. This is in the radio but not finished.

Enhanced Scanning. This feature will do scanning between two frequencies and if an active channel is found, it will store it and allow you to make a zone based upon what it found. This feature is expected to be completed in September. This is similar to what we had in the CS580

except much better.

GPS Roaming. This feature allows you to make a code plug based upon your current location. This feature will make a zone based on the closest 64 repeaters to your current location. We limit the repeaters available to within 2 degrees in latitude and longitude of your current location. This feature is expected to be completed in October.

Spectrum Analyzer. This feature will graphically show the frequency versus the amplitude over a frequency range. This feature is expected to be completed in August.

Channel Analyzer. This feature allows you to monitor a single channel and will save all the different CTCSS Tones, DCS code, and DMR groups that come across that channel. That allows you to monitor a repeater and know how it is being used. This feature is expected to be completed in September.

We still have about 60 of the used CS7000 M17 GPS left So you can get all the above for only \$199. When we run out the used radios we will only have the CS7000 M17 PLUS for \$499.

That deal was too good to pass up, so two used CS7000 M17 GPS units are now ordered for Tina and I, and we'll have them set up for use and demonstration at ZRDC 2025. It will be fun to use these with others who bring their CS7000 M17s to ZRDC 2025. Maybe we'll have the text messaging feature implemented on CS7000 M17 by then.

M17 Related Conference Reminders

[**M17 Conference 2025**](#) - 2025-09-06 and 07 in Nowy Dwór Mazowiecki, Poland.

Zero Retries Digital Conference 2025 - 2025-09-13 in Everett, Washington, USA. At least one M17 Presentation is planned, and hopefully there will be some hands-on demonstrations. One lucky random in-person attendee will be awarded a [Connect Systems CS7000 M17 PLUS portable radio](#) thanks to a generous donation to ZRDC 2025 by Connect Systems.

Leave a comment

Share

ZR > BEACON

By Steve Stroh N8GNJ

Short mentions of Zero Retries Interesting items.

[**12 Million Observations for the SatNOGS Network!**](#)

Another significant milestone has been achieved by the SatNOGS Network ! It has reached its twelve millionth observation, and we are wholeheartedly grateful to the entire Community for this achievement!

Thank you all for your contribution and dedication to SatNOGS!

SatNOGS fills a vital role in realizing the science experiments behind research satellites built and launched by educational institutions by providing a virtual network of ground stations for receiving satellite telemetry.

SatNOGS stations can be as simple as a "space" antenna, Software Defined Receiver, a Raspberry Pi, and an Internet connection.

My favorite SatNOGS antenna is my (currently unbuilt, but I have the pieces) [Halibut Electronics EggNOGS](#).

If You Build It, They Will Come! Packet Radio Repeater Email Node BBS (video)

Let's build a packet radio repeater including AX.25 networking, NET/ROM node services and a Winlink email server. This solar-powered system is under \$400 and built to last. With DigiPi.org, software is the easy part, let's focus on connecting great radio gear and building a permanent hill-top repeater system.

This is a great, interesting, approachable project by Craig Lamparter KM6LYW about how to build a standalone Packet Radio *digipeater* in 2025. I had an email exchange with KM6LYW about the terminology and he explained that he chose not to use “digipeater” because that term is now associated in the mind of most Amateur Radio Operators as *APRS* digipeater. This project is not that, but it's also not a *repeater* as it transmits and receives on the same frequency - 145.050.

KM6LYW built this project to be connected to the [145.050 Packet Radio Network](#) (email list):

In California, Nevada, and Oregon:

The VHF Ham Frequency at 145.050 is the home to an extensive NET/ROM Packet Radio Network

This group is for both the System Admins and the Users of that system.

Updates to Stations, Information about Nodes, and general questions are encouraged.

There were some unique aspects to this project. The first is that it's installed on a hill above his home, and it's a standalone station, using solar power / battery. The second is that he communicates with it from his shack via dedicated, private Wi-Fi link (it's pretty close). But the really cool aspect of it is that the 145.050 Packet Radio Network uses Net/ROM connectivity. I haven't heard that term in approximately forever.

It would have been a slight bit cooler if the 145.050 Packet Radio Network used other bands / frequencies / speeds / technologies such as 9600 bps on UHF, etc. That was one of the strengths of Net/ROM, that you could have “backbones” at higher speeds, that could be transparent to users connecting to nodes in the network. But as KM6LYW and I agreed, simpler technology deployed and working is far superior to “better” technology not yet deployed.

I love all these different approaches to Amateur Radio data communications.

SF-HAB Represented Amateur Radio at Open Sauce 2025



Graphic courtesy of SF-HAB.org

I was delighted to receive an email from long time Zero Retries reader Martin Rothfield W6MRR that Amateur Radio was present at [Open Sauce 2025](#) through [SF-HAB.org](#).

SF-HAB.org (HAB - High Altitude Balloon / Ballooning) regularly appears at events in the San Francisco Bay Area such as Open Sauce (OS) 2025, Solano County STEAM festival, and Chabot Space and Science Center. We will also be at Pacificon and Maker Faire. We display a two foot by four foot banner with the attached art (above). Unfortunately, most such events decline to allow onsite balloon launches as they're difficult to arrange logistically.

OS 2025 was a big event so it was not likely that visitors caught everything. It was surprising how many people traveled significant distances to attend, including folks from Europe and Australia.

SF-HAB had a great location by the entrance of Open Sauce 2025. We used a large monitor to display tracking, via an AMSAT Argentina tracking site, of a pico balloon that we launched about three months ago. Some OS 2025 attendees had experienced a HAB launch and were fascinated with pico balloons. I have to remember that "Pico-sats" is sexier. Several science teachers expressed interest in SF-HAB and "Pico-sats".

At OS 2025 there was a huge interest in SF-HAB from the general public. It always surprises me that so many people don't even know what Amateur Radio is. There were many groups of parents with kids in tow. Our target is families with young teens as they seem to be the best prospects for "recruiting" into Amateur Radio.

We used to announce launches from the South Bay and we had several families stop by and get their licenses to fly balloons. Some OS 2025 attendees had experienced a HAB launch and were fascinated with pico balloons. Several science teachers expressed interest but haven't heard anything yet.

Noisebridge is a hackerspace in the Bay Area and it has a balloon program called Spacebridge. If all goes well, on August 9 we'll have a simultaneous HAB launch. The HABs can hang at > 30 k' for a while creating a very large range circle (~250 miles). We usually fly a U/V crossband repeater. One of our folks in SF-HAB is a Meshtastic developer and we will hopefully activate a high altitude Meshtastic WAN.

My thanks to W6MRR for the great report from Open Sauce 2025 and SF-HAB's activities in general. I look forward to connecting again with W6MRR at Pacificon 2025 in a few months.

AREDN Release Candidate Includes Support for 802.11ah Devices

There was mention a couple of weeks ago of a new [July 2025 AREDN Release Candidate](#) (software) that is available for test. But unlike previous such

notes, details about what had changed weren't provided:

Nightly build 20250723 has been designated as the Release Candidate for the next AREDN production release. If nothing weird happens, the next production release will be around August 6th.

The recent nightly builds have been very stable. The AREDN team encourages you to wring them out and see if you can break them :-)

So, I pinged AREDN Ambassador / AREDN Obi Wan (and Zero Retries Pseudostaffer) Orv Beach W6BI for a *bit* more detail, and he replied:

The focus has been on fine-tuning the Babel protocol, and its integration alongside the OLSR protocol in the software.

Babel's claim(s) to fame:

- Highly-resistant to routing loops
- Broadcasts routing info only when a network change is detected, unlike OLSR which broadcasts constantly. Should substantially reduce routing-info-related traffic, which will help marginal links.

The next few production releases will continue to support both routing protocols; the Babel-only versions will stay in nightly builds for a while. But it's quite stable now and we're starting to see some regions/area begin moving to Babel-only networking, with positive results.

Support was added for:

- OpenWRT-One as the recommended device for an AREDN supernode
- NanoStation AC loco
- Several HaLow (900 MHz - 802.11ah) devices. (There's not even two dozen of these on the network yet, and most are in test networks).

I think W6BI is burying the lede more than a little bit with that last bullet point:

Several HaLow (900 MHz - 802.11ah) devices

I think that development is huge!

Once fully implemented, AREDN won't be limited to 2.4 / 5 GHz microwave links that must be optical line of sight (no steenkin' trees allowed in the LOS). Instead, 902-928 MHz linking can be used for AREDN, which can be made to work through trees, unlike 2.4 GHz and especially 5 GHz links.

I had hoped for such a development in **Zero Retries 0169** - 802.11ah / HaLow Gets a Bit More Mainstream, and Potentially, Integrates with AREDN, with "bridging" a 802.11ah device via Ethernet to an AREDN (2.4 / 5 GHz) device. Now it's almost "mainstream" in AREDN.

I've asked for more details on how AREDN has tackled the integration of 802.11ah / HaLow and I hope that more details will emerge within the next few issues.

It's More Than Just The Tech: Lessons Learned in Funding R&D

Rosy Schechter KJ7RYV (Executive Director / CEO of ARDC) on the ARDC blog:

Recently a conflict emerged between two ARDC grant recipients – M17 Project and Multimode Digital Voice Modem (MMDVM). As the conflict has been unfolding, a variety of individuals have asked us to comment and provide our perspective. Out of respect for our grantees, our policy is to maintain confidentiality. Thus, we do not discuss specifics related to our grantees with anyone other than those directly involved in their project. Additionally, as a funder, it is inappropriate for us to mediate such conflicts.

Not only is it not appropriate for ARDC to "mediate" this issue... it would be nearly impossible for them to do so. Thus I strongly agree with ARDC's stated position. This issue is for the respective individuals and the two communities to sort out.

Compared to Amateur Radio and Education projects, the GET found that the majority of R&D projects showed uncertain outcomes, and no score higher than Medium (below High and Very High). More details can be found in Appendix A of our 2024 GET report.

So, what can we do to improve these outcomes? As we've gotten more experience with R&D projects, and noting these challenges, we've looked for ways to improve the evaluation and oversight process on our side. First, in 2024, we initiated the GET, who reviewed every grant we'd made from 2019-2023 and provided insights and recommendations like the ones above. Now, they review both final and periodic reports closer to the time they are received, providing opportunities for quicker feedback to our grantees and Grants Advisory Committee (GAC). To support getting more useful information in our final reports, they now include questions that are specific to R&D. We are also researching other methods to ensure better ongoing oversight (including financial oversight) and opportunities to offer support for these projects, noting that there may not be a one-size-fits-all approach.

...

There are even more factors related to the project's ongoing sustainability that we now know to look for. More than just a talented technical team with demonstrated development success, we now also seek the following skillsets on a project team:

- Project management (including funds management),
- Community management and engagement,
- Opportunities to test and incorporate feedback from stakeholders around usability, and
- Effective communication with relevant stakeholders (including us).

These skills are critical to a project's success, both during and after the lifetime of the grant. They are particularly important for open source projects, because they demonstrate that a project will have sustainability beyond the end of our funding – which is what we want to see.

In support of manifesting ARDC's [vision](#), a goal in funding R&D work is to have the results spread broadly throughout the community and around the world. The kinds of issues listed below challenge that goal. Often, other proposals without these issues are more likely to succeed broadly, and are thus more attractive to us. With this in mind, ARDC often declines to support applications from projects that:

- have a fractured project team or contributor community,
- demonstrate an inability to work collaboratively with partners, and/or
- demonstrate an inability to communicate well with the stakeholders or community they hope to serve.

This is a great, thoughtful, detailed article about ARDC's learning culture and tuning their grant awarding process to apply (hard won) lessons learned. Please read the entire article. Foundations offering grants is... centuries (?) old by now, but applying *significant* grants into Amateur Radio *Open Source projects* in the 21st century is a new, unique, challenging issue given the highly technical nature of development projects and the small pool of talented, willing developers and the relatively small Amateur Radio community (versus general society).

I applaud ARDC's new emphasis on project management, community management / engagement, and effective communication. (*I'm all in on **effective communication!***)

And, I think this is a... not warning, exactly... but perhaps a reminder about what's at stake from poor behavior and not treating the community you are involved with basic respect.

Kudos to KJ7RYV and ARDC for this development!

[HamTV is Active on the International Space Station](#)

Amateur Radio Daily:

The installation of new equipment aboard the International Space Station (ISS) to reenable HamTV appears to be successful. [ARISS reports on Mastodon](#) that ground stations over Europe had successfully received the HamTV carrier signal on July 29th. Carrier transmissions are expected to continue over the next few days. Additional reports are expected from North American hams.

Documentation on receiving HamTV from the ISS is [available from The British Amateur Television Club](#) (BATV). ARISS provides a [live feed of video](#) when the ISS is in range of HamTV receiver stations.

Just this one line of detail from the documentation link explains how Zero Retries Interesting... and challenging... it will be to receive HamTV from the ISS:

2395 MHz, 2.0 Msymbols/second, QPSK, DVB-S, FEC 1/2, MPEG-2 video with MP2 audio

No passive, fixed antenna is going to work for this. At 2.395 GHz, a dish (or at least mesh) antenna, with active 2-axis control and tracking will be required. And that's just the *antenna*!

This seems to be a similar set of equipment as terrestrial Digital Amateur Radio television (DATV). Speaking of DATV, ISS HamTV would be a cool video feed into DATV repeater systems when an overhead pass is in progress.

This is going to be *cool*. Kudos to the parties that resurrected this system for the ISS.

[GPS on the Fritz? Britain and France Plot a Backup Plan](#)

Dan Robinson in The Register:

One of the systems being considered is eLoran (enhanced long-range navigation), a terrestrial-based system that uses ground-based radio towers operating within the 90-110 kHz low frequency band, which is said to be much more challenging to block.

The use of low frequency bands enables signals to travel long distances into areas that satellite-based PNT systems cannot reach, such as inside buildings.

It's no coincidence that eLoran is a prime candidate, as it is a development of technology used by the military in the past. The UK Ministry of Defence (MoD) also issued a Request for Information (RFI) last year for a [portable eLoran network](#) comprising a minimum of three transmitters that can be transported in a shipping container for deployment in the field.

[LORAN-C](#) of the 20th century was happily abandoned as soon as GPS "fuzzing" was turned off by the US Department of Defense and reliable and affordable GPS receivers were available for large marine vessels. Although LORAN infrastructure is admittedly expensive, and the accuracy wasn't nearly as good as what GPS could offer, *not* having precision location available in certain situations, when satellite navigation signals are degraded or jammed, is just too expensive (as in *catastrophic* in many circumstances).

For example, imagine the "floating megaton bomb" that a Liquefied Natural Gas (LNG) tanker would be as it's trying to navigate in close quarters, in reduced visibility (fog or high sea states) if its primary navigation system is significantly degraded or blocked. While we have some solutions, like the increasingly capable and cost effective Inertial Navigation Systems (INS), building and operating new eLORAN infrastructure seems to be cheap insurance.

Not to mention, we now have five decades or so of improved radio and compute technology since LORAN-C was developed and deployed. Thus I'll guess that eLORAN in the 21st century would work better than anyone could imagine once those newer technologies are applied. It's my guess that we'll see eLORAN infrastructure being built by the end of this decade. Yay radio technology!

Leave a comment

Share

To receive new issues of Zero Retries every week via email, become a free subscriber. To support Zero Retries, paid subscriptions are appreciated, *but entirely optional*.

Subscribe

Zero Retries Boilerplate

The [Zero Retries Store](#) is now open for business with quality Zero Retries branded merchandise and items being retired from Steve's N8GNJ Labs.

These bits were handcrafted (by a mere human, not an Artificial Intelligence bot) in beautiful Bellingham ([The City of Subdued Excitement](#)), Washington, USA, and linked to the Internet via [Starlink Satellite Internet Access](#).

See the **Zero Retries Boilerplate** page for significant acknowledgements and other information relevant to Zero Retries. For new readers of Zero Retries, that page, and the **About Zero Retries** page has useful information to check out.

My ongoing *Thanks* to:

Tina Stroh KD7WSF for, well, *everything*!

Jack Stroh, Late Night Assistant Editor Emeritus

Shrek Stroh, Late Night Assistant Editor In training

Annual Founding Members who generously support Zero Retries financially:

Founding Member 0000 - Steven Davidson K3FZT (Renewed 2025, *3rd year!*)
Founding Member 0001 - Randy Smith WU2S (Renewed 2024, *2nd year!*)
Founding Member 0002 - Chris Osburn KD7DVD (Renewed 2025, *3rd year!*)
Founding Member 0003 - Don Rotolo N2IRZ (Renewed 2025, *3rd year!*)
Founding Member 0004 - William Arcand W1WRA (Renewed 2024, *2nd year!*)
Founding Member 0005 - Ben Kuhn KU0HN (Renewed 2024, *2nd year!*)
Founding Member 0006 - Todd Willey KQ4FID (Renewed 2024, *2nd year!*)
Founding Member 0007 - Merik Karman VK1DF / VK2MKZ (Renewed 2025, *3rd year!*)
Founding Member 0008 - Prefers to Remain Anonymous 14 (Renewed 2024, *2nd year!*)
Founding Member 0009 - Prefers to Remain Anonymous 19 (Renewed 2025, *2nd year!*)
Founding Member 0011 - Rick Prelinger W6XBE (New 2024)
Founding Member 0012 - Ryan Tolboom N2BP (New 2024)
Founding Member 0013 - Newton White N4EWT (New 2025)
Founding Member 0014 - Joe Hamelin W7COM (New 2025)
Founding Member 0015 - Rich Stocking N7OP (New 2025)
Founding Member 0016 - Prefers to Remain Anonymous 77 (New 2025)

Numerous Annual and Monthly subscribers who also generously support Zero Retries financially!

You thousands of readers of Zero Retries without which there would be little point in publishing this newsletter.

Permission for Reuse of Zero Retries Content

Blanket permission is granted for *Amateur Radio use* of any Steve Stroh content in Zero Retries for Amateur Radio newsletters and distribution via Amateur Radio such as (but not limited to) Packet Radio Networks, Packet Radio Bulletin Board Systems, Repeater Nets, etc. Specific blanket permission is granted to TAPR to use any Steve Stroh content in Zero Retries for the TAPR Packet Status Register (PSR) newsletter (I owe them from way back).

In such usage, please provide appropriate authorship credit for the content (especially for guest authors) and mention that it was first published in Zero Retries newsletter, preferably in this format:

This article is reprinted with permission. It was first published in Zero Retries newsletter, issue Zero Retries (number), (date) - (include full web link of the specific issue).

It's appreciated (a courtesy, *but not required*) to notify Zero Retries Editor Steve Stroh N8GNJ of any reuse of Zero Retries content - stevestroh@gmail.com

If you'd like to republish an article in this issue for other uses, just ask.

All excerpts from other authors or organizations, including images, are intended to be [fair use](#). *Unless otherwise noted in the article*, there are no paid promotional items in any Zero Retries articles.

Portions Copyright © 2021, 2022, 2023, 2024, 2025 by Steven K. Stroh.

This issue released on 2025-08-01

Keywords for this Issue

Zero Retries 0213 dated 2025-08-01:

802.11ah, **Amateur Radio**, Amateur Radio Digital Communications, Amateur Radio on the International Space Station, ARDC, AREDN, ARISS, Connect Systems, CS7000 M17 GPS PLUS, **Data Communications**, **Digital Communications**, **Digital Voice**, Digipeater, **DV**, eLORAN, FCC, Federal

Communications Commission, **Ham Radio**, Ham Radio Workbench Podcast, HamTV, HRWB, International Space Station, KD7WSF, LORAN, M17 Project, **N8GNJ**, **Packet Radio**, **Radio Technology**, SatNOGS, **Software Defined Radio**, **Software Defined Receiver**, SF-HAB, **Steve Stroh**, Tina Stroh, **Zero Retries**, **Zero Retries Digital Conference**, **ZRDC 2025**

Keywords in **Bold** are regular mentions in each issue.

Footnotes for this Issue

To see the relevant sentence for the footnote, just click the footnote number.

[1](#)

For background on the potential for DMR Single Frequency Repeaters, see

- **Zero Retries 0205** - Thorough Explanation of Single Frequency Digital Mobile Radio Repeater
- **Zero Retries 0206** - Followup On Single Frequency Repeaters
- **Zero Retries 0207** - Amateur Radio's Lack of Imagination About Repeater Technology

[2](#)

Of course, there is the argument that Amateur Radio offers emergency communications. That too is a defensible reason for continuing Amateur Radio spectrum allocations. That particular discussion is worth having, but out of scope in *this* discussion.

[3](#)

And, admittedly at times, messy, disjointed, inefficient, painful, fractious, etc. Kind of like typical human society.

[4](#)

I'm deliberately not linking to the video as I don't want to drive more traffic to it.